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PATENT SPECIFICATION

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(54) IMPROVEMENTS IN OR RELATING TO ACCUMULATORS

(71) We, ROBERT BOSCH GMBH, a German Company, of Postfach 50, 7 Stuttgart 1, Germany, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention relates to accumulators and especially to block-battery type lead accumulators having in the block cover a topping up liquid e.g., electrolyte, container which is common to all the cell compartments.

Known wet accumulators or block batteries having such an electrolyte container common to all the cell compartments, have the disadvantage that, owing to the vibration occurring in the motor vehicle, electrolytic fluid flows from the electrolyte container into the individual cell compartments and overfills the latter. The electrolyte container which has thus been emptied leads the driver to assume that the lead accumulator has lost water due to gas formation, and the driver prematurely refills the electrolyte container with water. This results in too high a level of the electrolyte in the cell compartment and there is then the risk of the electrolyte flowing out through the degassing openings in the battery and causing damage, particularly during the charging operation or when the vehicle is subjected to heavy vibration.

An object of the invention is to provide a block battery supply container having an electrolyte container common to all the cell compartments, such that it may be difficult or even impossible to overfill the cell compartments with electrolyte and to cause damage by electrolyte flowing out of the battery. The construction of the required device is to be simple, i.e. it is to have no movable control elements and no complicated sealing elements.

The present invention therefore provides a wet accumulator comprising an electrolyte vessel having a plurality of individual cell compartments communicating with a common liquid container located in the electrolyte vessel cover through a restricted passage between each cell compartment and the said container, said passage opening into a tubular member of greater cross-sectional area than said passage and which extends from the interior surface of said cover to at least the proposed electrolyte level, and a closure member which tightly seals said liquid container when mounted thereon, said closure member having projections thereon each of which is able to enter and thereby close one of said restricted passages when said closure member is mounted as aforesaid.

For the purpose of adjusting the prescribed or proposed level of the electrolyte in the cell compartments, the tubular members preferably extend below the prescribed level of the electrolyte to an extent substantially equal to the internal height of the electrolyte container.

The present invention will be further described with reference to the accompanying drawings in which:—

Fig. 1 is a cross-sectional view through the top region of a block battery which is constructed in accordance with the invention and which has an electrolyte container common to all the cell compartments;

Fig. 2 is a longitudinal section through the top region of the block battery, taken on the line I—I in Fig. 1;

Fig. 3 is a cross-sectional view taken through a portion of the top region of a further embodiment of a block battery of the present invention.

The electrolyte vessel or block case 1 illustrated in Figs. 1 and 2 is made from polypropylene and is connected in a liquid-tight manner to a block cover 2, also made from polypropylene, by any known process for example glueing, welding or cementing. The case 1 contains an electrolyte 3 and blocks of plates (not illustrated for the sake of clarity) together with the normal connecting straps and cell connectors leading directly through the partitions 4 in the block case. The nominal level 5 of the electrolyte 3 in the cell compartments 6 is located above the blocks of plates when in position.

An electrolyte container 8, which is sealed by a polypropylene closure cap 7, extends in the block cover 2 transversely across and is common to all the individual cell compartments 6. A tubular member 9 extends from the electrolyte container 8 into each cell compartment 6 which

opens into the electrolyte container 8 by way of a restricted passage 10, and the free end 11 thereof extends below the nominal level 5 of the electrolyte 3 to an extent substantially equal to the internal height 12 of the liquid container 8. The tubular member 9 has a circular cross-sectional area of about 80 mm², whereas the passage 10 has a cross-sectional area of only about 10mm². The walls of the electrolyte container 8 extend in a funnel-like manner towards the passages 10 which may be tightly sealed by projections 13 on the closure member 7 when the closure member 7 is mounted in position as shown. The projections 13 project from the underside of the closure member 7. The closure member 7 is engageable with the electrolyte container 8 by means of a collar 14 which is provided with a sealing lip and which extends around the edge of the closure member 7. The closure member 7 is also provided with a tongue 15 which facilitates lifting the closure member 7 from the electrolyte container 8. The closure member seals substantially flush with the top 16 of the block cover 2.

A degassing lock 17, illustrated in a portion of the block cover 2 shown in Fig. 1, is present in each cell compartment 6. An end terminal 18 is also illustrated in Fig. 1.

When it is desired to pour the electrolyte liquid into the accumulator, the closure member 7 is firstly opened by pushing a screwdriver or the like instrument under tongue 15, and the liquid is then poured into the electrolyte container 8. Residual air contained in the cell compartments 6 can escape through the degassing locks 17. However, as soon as the level of the electrolyte reaches the opening at the free end 11 of the tubular member 9, the air in the tubular member 9 is compressed between the electrolyte 3 in the cell compartment 6 and the liquid 19 in the electrolyte container 8. An air pressure corresponding to the pressure of the head of liquid 19 in the electrolyte container 8 acts from below upon the restricted passages 10 as soon as the level of the electrolyte has reached its nominal level 5. The pressures above and below the passages are then equal, and no more liquid 19 can flow into the cell compartment 6. When the nominal level 5 of the electrolyte 3 has been reached in all the cell compartments 6, the level of the liquid in the electrolyte container 8 no longer falls.

The closure member 7 is then closed and the projections 13 extend into the passages 10, which are thereby sealed, so that no further liquid 19 can flow from the electrolyte container 8 into the cell compartments 6 if the vehicle vibrates or when the accumulator is being charged, thus preventing overfilling of the cell compartments 6 with electrolyte. Even during subsequent inspection of the level of the electrolyte, the liquid 19 remains in the electrolyte container 8 after the closure cap 7 has been opened, if the cell compartments 6 are still adequately filled.

Fig. 3 shows a further embodiment of the invention, improved with respect to the sealing of the restricted passages 10, in which each passage 10 is located in an individual depression 20 which is formed in the electrolyte container 8 and into which sealingly extends a tubular portion 21 of the closure member 7 arranged coaxially with the projection 13. Necked-down portions 22 provided around the root of the tubular portion 21 impart greater flexibility to the tubular portion 21.

Fig. 3 also shows closure member 7 hingedly connected to a degassing lock insert 23 which includes a degassing lock provided with an aperture 24. The lock insert 23 is pressed in a stopper-like manner into an aperture 26, provided with a collar 25 in the block cover 2. A groove 27 in the closure member 7 facilitates the opening of the closure member 7. The position of the opened closure member is indicated in phantom.

The openings 26 in the electrolyte vessel or container have an inside width of about 18 mm which permits insertion of an electrolyte measuring hydrometer or dip stick. A measuring mark 28 for the level of the electrolyte in the cell compartments is located on an extended wall portion 29 of the collar 25.

In one specific case, the pipe tubular member 9 has an internal cross-sectional area of from 60 to 100 mm² and the throttle passage 10 has a cross-sectional area of from 5 to 15 mm²: and such batteries are suitable for motor vehicles.

WHAT WE CLAIM IS:—

1. A wet accumulator comprising an electrolyte vessel having a plurality of individual cell compartments communicating with a common liquid container located in the electrolyte vessel cover through a restricted passage between each cell compartment and the said container, said passage opening into a tubular member of greater cross-sectional area than said passage and which extends from the interior surface of said cover to at least the proposed electrolyte level, and a closure member which tightly seals said liquid container when mounted thereon, said closure member having projections thereon each of which is able to enter and thereby close one of said restricted passages when said closure member is mounted as aforesaid.

2. An accumulator as claimed in claim 1 in which the tubular members extend into the electrolyte vessel below the level proposed for the electrolyte a distance substantially equal to the internal height of the liquid container.

3. An accumulator as claimed in claim 1 or 2 in which the tubular members have an internal cross-sectional area of from 60 to 100 mm² and the restricted passages have a cross-sectional area of from 5 to 15mm².

4. An accumulator as claimed in any preceding claim in which each of said passages opens into a depression in the base of said liquid container, and said closure member is further provided with tubular members each located

concentrically with an associated projection so that upon said closure member being mounted in position, each said further tubular member extends into associated depression.

5. An accumulator as claimed in claim 4 in which said depression is funnel-shaped with the narrow portion thereof opening into said passage.

6. An accumulator as claimed in any preceding claim in which said closure member is adapted to seal said liquid container substantially flush with the vessel cover, and said closure member is further provided with a collar which extends around the periphery of the closure member and is engageable with said electrolyte vessel, said collar having a sealing lip to ensure that a tight seal is formed between the collar and the vessel.

7. An accumulator as claimed in any preceding claim in which the closure member is made of a flexible plastics material.

8. An accumulator as claimed in any preceding claim in which the closure member is hingedly attached to a degassing plug insert.

9. An accumulator as claimed in claim 1 substantially as hereinbefore described with reference to Figs. 1, 2 or 3 of the accompanying drawings.

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Fig.1

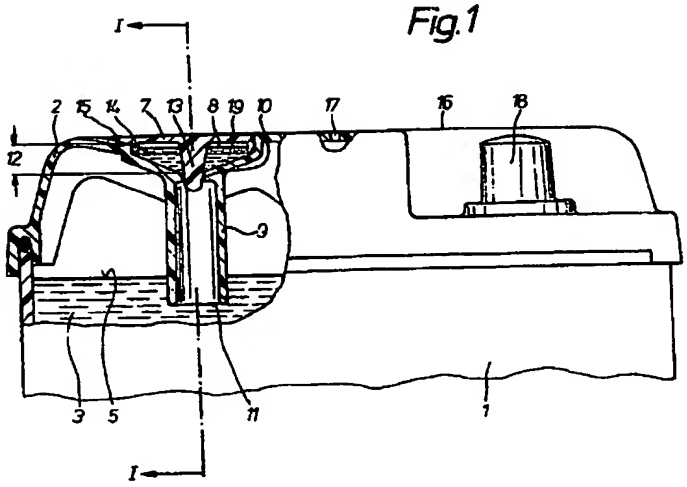

Fig.2

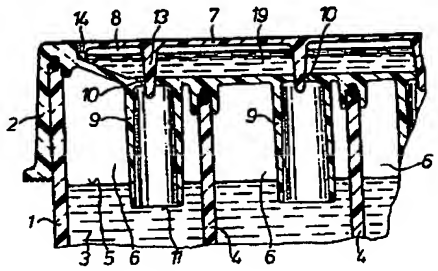

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Fig. 3